FACT SHEET FOR NPDES PERMIT No. WA 000085-0
(Simp-NPDES-FS-2008-10.doc)

FACILITY NAME: Simpson Tacoma Kraft Company, LLC

PURPOSE of this Fact Sheet

This fact sheet explains and documents the decisions Ecology made in drafting the proposed National Pollutant Discharge Elimination System (NPDES) permit for Simpson Tacoma Kraft Company, LLC (Simpson).

The Environmental Protection Agency (EPA) developed the NPDES permitting program as a tool to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters." EPA delegated to Ecology the power and duty to write, issue, and enforce NPDES permits within Washington State. Both state and federal laws require any industrial facility to obtain a permit before discharging waste or chemicals to a water body.

An NPDES permit limits the types and amounts of pollution the permittee may discharge. Those limits are based either on (1) the pollution control or wastewater treatment technology available to the industry, or on (2) the receiving water's customary beneficial uses. This fact sheet complies with Section 173-220-060 of the Washington Administrative Code (WAC), which requires Ecology to prepare a draft permit *and accompanying fact sheet* for public evaluation before issuing an NPDES permit.

PUBLIC ROLE in the Permit

Ecology makes the draft permit and fact sheet available for public review and comment at least thirty (30) days before we issue the final permit to the facility operator (WAC 173-220-050). Copies of the fact sheet and draft permit for Simpson, NPDES Permit No. WA-000085-0, are available for public review and comment from August 12, 2008 until the close of business September 12, 2006. For more details on preparing and filing comments about these documents , please see **Appendix A - Public Involvement**.

Before publishing the draft NPDES permit, Simpson, reviewed it for factual accuracy. Ecology corrected any errors or omissions about the facility's location, product type or production rate, discharges or receiving water, or its history.

After the public comment period closes, Ecology will summarize substantive comments and our responses to them. Ecology will include our summary and responses to comments to this Fact Sheet as **Appendix** D - **Response to Comments**, and publish it when we issue the final NPDES permit. The rest of the fact sheet will not be revised, but the full document will become part of the legal history contained in the facility's permit file.

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I. INTRODUCTION

General Facility Information

Applicant:	Simpson Tacoma Kraft Company, LLC
Facility Name and Address:	Simpson Tacoma Kraft Company, LLC Street: 801 Portland Avenue Tacoma, WA 98421 Mailing: P.O. Box 2133 Tacoma, WA 98401
Type of Treatment:	Secondary
SIC Code	2621
Discharge Location:	Inner Commencement Bay Latitude: 47º 16' 38" Longitude: -122º 25' 54"
Water Body ID Number:	1224819475188

The Federal Clean Water Act (FCWA, 1972, and later amendments in 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One mechanism for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System of permits (NPDES permits), administered by the federal Environmental Protection Agency (EPA). The EPA authorized the State of Washington to manage the NPDES permit program in our state. Our state legislature accepted the delegation and assigned the power and duty for conducting NPDES permitting and enforcement to Ecology. The legislature defined Ecology's authority and obligations for the wastewater discharge permit program in 90.48 RCW (Revised Code of Washington).

Ecology adopted rules describing how we exercise our authority:

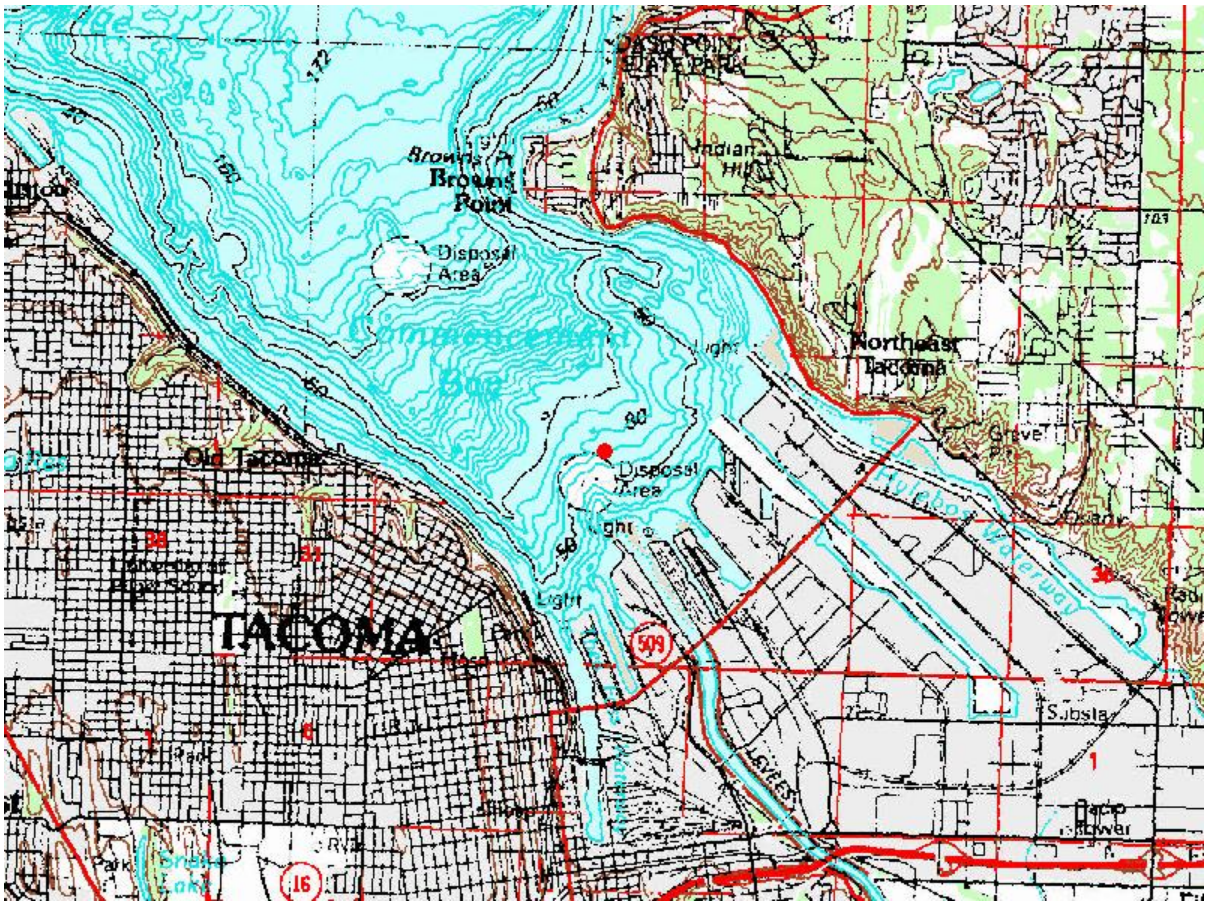
- Procedures Ecology follows for issuing NPDES permits (chapter 173-220 WAC),
- Water quality criteria for surface waters (chapter 173-201A WAC) and for ground waters (chapter 173-200 WAC)
- Sediment management standards (chapter 173-204 WAC).

These rules require any industrial facility operator to obtain an NPDES permit before discharging wastewater to state waters. They also define the basis for limits on each discharge and for other performance requirements imposed by the permit.

Under the NPDES permit program Ecology must prepare a draft permit and accompanying fact sheet, and make it available for public review. Ecology must also publish an announcement

(public notice) telling people where they can read the draft permit, and where to send their comments on the draft permit, during a period of thirty days (WAC 173-220-050). (See **Appendix A--Public Involvement** for more detail about the Public Notice and Comment procedures). After the Public Comment Period ends, Ecology may make changes to the draft NPDES permit in response to comment. Ecology will summarize the responses to comments and any changes to the permit in **Appendix D.**

Simpson discharges treated wastewater to Inner Commencement Bay. The dot (●) in the center of the following map represents the discharge location.



II. BACKGROUND INFORMATION

A. Facility Description

History

The Simpson Tacoma Kraft Company, LLC (Simpson) is an operating subsidiary of the Simpson Investment Company. The mill was constructed in 1928 and Simpson purchased it from Champion in 1985. Simpson is an EPA major facility currently renewing their NPDES permit.

Since Ecology issued the last permit, Simpson made numerous improvements to their production process. Most were small. Those changes that increased production most significantly include:

incremental improvements to the old corrugated cardboard (OCC) processing system, and
(reconfiguring No. 4 Recovery Furnace to allow more black liquor throughput.

Mill production increased slightly over 10% during the previous permit term.

In 2007 Ecology issued Simpson a Prevention of Significant Deterioration (PSD) Permit and a Notice of Construction (NOC) Order for air emissions from a planned cogeneration unit. Ecology expects minimal wastewater impacts due to the project.

Industrial Process

The mill is an integrated pulp and paper facility equipped with conventional Kraft recovery systems. Units include a recovery boiler, two lime kilns, two power boilers, and a three-stage substitution bleach plant. The mill produces a mix of bleached and unbleached pulp and paper products from chips and recycled old corrugated cardboard (OCC). Total production is about 1500 air dry tons/day. Simpson does not anticipate making significant changes in production rate. The mill operates continuously with the exception of infrequent down periods for maintenance. Approximately 400 employees work at the mill.

The kraft process used at the mill is an alkaline process requiring heat. Principal chemicals used to make the cooking liquor include caustic and lime. Fuels used to provide heat include oil, natural gas, and hog fuel along with spent cooking liquor.

The bleach plant utilizes an elemental chlorine free (ECF) process. Chlorine dioxide, oxygen, hydrogen peroxide, and sodium hydroxide are the principal chemicals used in bleaching. Additional chemicals are also used in the paper mill to aid the papermaking process.

Wastewater Treatment

The mill wastewater treatment system includes:

a primary clarifier,
a pure oxygen activated sludge (UNOX) system, and
two secondary clarifiers.

The UNOX system has been in operation since 1976.

Water use by Simpson includes an average of 15.5 MGD of purchased fresh water for the process, 5.4 MGD of bay water for direct contact cooling, and 8.2 MGD of bay water for indirect contact cooling. The treated effluent is combined with the indirect cooling water and then discharged into Commencement Bay.

Simpson employs best management practices (BMP) to help assure satisfactory wastewater treatment. Conductivity meters are stationed at key points in the wastewater collection system. Also, a color meter measures color of the UNOX system influent flow. Excess conductivity and color indicate spills or upsets within the mill that may prevent proper wastewater treatment. Simpson investigates the cause of any excess measurements and takes appropriate corrective action.

Residual Solids

Residual solids captured in the wastewater treatment process include sludges from the primary and secondary clarifiers. The sludges are mixed, then dewatered using a rotary screen thickener and screw press. The dewatered sludge is mixed with hog fuel and burned in No. 7 Power Boiler to recover energy. No. 7 Power Boiler ash is currently shipped to a landfill for disposal.

Discharge Outfall

The treated mill wastewater is discharged via a 54 inch diameter outfall pipe that is 920 feet long. Discharge is through a high rate diffuser into inner Commencement Bay (Outfall 001). The diffuser section is 180 feet long and has 29 nozzles. The average diffuser depth is 57.5 feet (MLLW).

B. Permit Status

Simpson submitted an application for permit renewal dated May 1, 2006. Ecology accepted it as complete on June 30, 2006.

Ecology issued the previous permit for this facility on November 1, 2001. The previous permit placed effluent limits for the following parameters on treated wastewater discharged into Commencement Bay.

Biochemical Oxygen Demand (5-day)
Total Suspended Solids
AOX
pH

Also, the previous permit placed limits on bleach plant effluent for the following parameters.

Tetrachlorocatechol
Tetrachloroguaiacol
Trichlorosyringol
4,5,6-trichloroguaiacol
3,4,6-trichlorocatechol
3,4,5-trichlorocatechol
3,4,5-trichloroguaiacol
2,3,4,6-tetrachlorophenol
3,4,6-trichloroguaiacol
Pentachlorophenol
2,4,6-trichlorophenol
2,4,5-trichlorophenol
2,3,7,8-TCDD
2,3,7,8-TCDF
Chloroform

C. Summary of Compliance with Previous Permit Issued

Ecology staff last conducted a non- sampling compliance inspection on November 8, 2007.

Ecology assessed Simpson compliance based on our review of the facility's Discharge Monitoring Reports (DMRs) and on inspections conducted by Ecology. The wastewater treatment discharge was in compliance during the history of the permit issued on November 1, 2001 with the exception of two incidents resulting in three violations. The violations were:

Date	Discharge	Parameter	Limit	Measured
6/28/06	mill effluent	BOD daily maximum	16,305 lb/D	24,500 lb/D
6/29/06	mill effluent	BOD daily maximum	16,305 lb/D	19,400 lb/D
4/8/07	mill effluent	BOD daily maximum	16,305 lb/D	17,300 lb/D

The June 2006 violations resulted from a series of pulping liquor overflow events. The April 2007 violations resulted primarily from plugged brown stock screens resulting in liquor spills routed directly to the wastewater treatment system. In both cases, Simpson took prompt and appropriate corrective actions and measures to prevent recurrence. Ecology issued a penalty for each violation.

D. Wastewater Characterization

The concentration of pollutants in the discharge was reported in the NPDES application and in discharge monitoring reports. Parameters detected in the effluent were as follows:

Wastewater Characterization

Parameter	Average	Maximum	Units
Biochemical Oxygen Demand *(BOD)*	11.5	123	mg/L
Chemical Oxygen Demand *(COD)*	456	1,140	mg/L
Total Organic Carbon *(TOC)*	103	114	mg/L
Total Suspended Solids *(TSS)*	23.3	372	mg/L
Bromide	8.6		mg/L
Color	750		Color Units
Total Organic Nitrogen (as N)	1.3		mg/L
Total Phosphorus	0.44		mg/L
Radioactivity - alpha	34		pCi/L
Radioactivity - beta	57		pCi/L
Radioactivity - radium	3.8		pCi/L
Radioactivity - radium 226	0.02		pCi/L
pH	5.20 (min)	8.50	SU

Parameter	Average	Maximum	Units
Sulfate	665		mg/L
Surfactants	0.10		mg/L
Turbidity	38		NTU
Aluminum	515		ug/L
Ammonia (As N)	0.54	5.4	mg/l
Antimony	<1.0	2	ug/L
Arsenic	<22	59	ug/L
Barium	66		ug/L
Bhc - Gamma	<0.039	0.040	ug/L
Boron	884		ug/L
Cadmium	<1.3	1.8	ug/L
Chloroform	<7	9.3	ug/L
Chromium	10	17	ug/L
Cobalt	0.5		ug/L
Copper	7	10	ug/L
Iron	171		ug/L
Lead	3	9	ug/L
Magnesium	190,000		ug/L
Manganese	252		ug/L
Mercury	<0.008	0.0113	ug/L
Molybdenum	12		ug/L
Nickel	<12	20	ug/L
Total Phenols	0.03	0.11	ug/L
Selenium	<11	37	ug/L
Titanium	12		ug/L
Zinc	54	103	ug/L

E. SEPA Compliance

Regulation exempts reissuance or modification of any wastewater discharge permit from the SEPA process as long as the permit contains conditions no less stringent than federal effluent limitations and/or state rules and regulations. This permit renewal meets those criteria and is exempt from SEPA review.

III. PROPOSED PERMIT CONDITIONS

Federal and State regulations require that effluent limits in an NPDES permit must be either technology- or water quality-based.

- Technology-based limits are based upon the treatment methods available to treat specific pollutants. Technology-based limits are set by the EPA and published as a regulation, or Ecology develops the limit on a case-by-case basis (40 CFR 125.3, and chapter 173-220 WAC).

- Water quality-based limits are calculated so that the effluent will comply with the Surface Water Quality Standards (chapter 173-201A WAC), Ground Water Standards (chapter 173-200 WAC), Sediment Quality Standards (chapter 173-204 WAC) or the National Toxics Rule (40 CFR 131.36).

- Ecology must apply the most stringent of these limits to each parameter of concern. These limits are described below.

The limits in this permit reflect information received in the application. Ecology evaluated the permit application and determined the limits needed to comply with the rules adopted by the State of Washington. Ecology does not develop effluent limits for all reported pollutants**.** Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation.

Nor does Ecology usually develop permit limits for pollutants that were not reported in the permit application but that may be present in the discharge. The permit does not authorize discharge of the non-reported pollutants. During the five-year permit term, the facility's effluent discharge conditions may change from those conditions reported in the permit application. The facility must notify Ecology, as described in 40 CFR 122.42(a), if significant changes occur in any constituent. Industries may be in violation of their permit until the permit is modified to reflect additional discharge of pollutants.

A. Design Criteria

Under WAC 173-220-150 (1)(g), neither flows nor waste loadings may exceed approved design criteria. Design criteria, as system is currently operated, for this facility's treatment plant were obtained from Simpson and are presented below:

Design Criteria for Simpson UNOX Wastewater Treatment Plant

Parameter	Design Quantity
Monthly average flow (max. month)	34 MGD
BOD_5 influent loading (3 month rolling average)	64,287lb/D

B. Technology-Based Effluent Limits

Ecology sets technology-based limits by regulation or on a case by case basis. EPA periodically evaluates specific industries, such as pulp and paper, and publishes federal effluent guidelines which represent technology-based effluent limitations. Washington state law imposes a requirement to provide all known available and reasonable methods of treatment (AKART). AKART may dictate more stringent technology-based limits than the federal effluent guidelines.

Ecology based the effluent limits for Simpson on Best Conventional Pollutant Control Technology (BCT), Best Available Technology Economically Achievable (BAT), Best Practicable Control Technology Currently Available (BPT), and on New Source Performance Standards (NSPS), as developed by the Environmental Protection Agency (EPA). On December 17, 1993, EPA proposed revised federal effluent guidelines for the pulp and paper industry that it

referred to as the "Cluster Rule." Following extensive review and public comments, EPA adopted and published the Cluster Rule (40 CFR Part 430) on April 15, 1998.

Simpson currently generates wastewater from three production classes identified in 40 CFR Part 430 - The Pulp, Paper, and Paperboard Point Source Category (April 15, 1998). The classes are:

- Subpart B - Bleached Papergrade Kraft and Soda Subpart.
- Subpart C - Unbleached Kraft Subpart.
- Subpart J - Secondary Fiber Non-Deink Subpart.

Ecology must decide whether the effluent guidelines also constitute "all known, available and reasonable methods of treatment" (AKART). As a general rule, if the effluent guidelines for a particular pollutant/source category are five years old or newer, Ecology presumes they meet AKART. If the effluent guidelines are over 10 years old, Ecology reviews the federal effluent guidelines development document and analyzes unit processes design and efficiencies to determine that the effluent guidelines constitute AKART and meet the intent of RCW 90.48.520. The federal effluent guidelines development document describes production processes, pollutants generated, treatment efficiencies, and unit process designs present nationwide in the specific industry at the time of effluent guideline development. Ecology applied new source performance standards on the basis of AKART to all production increases since 1984.

Since the Cluster Rule is now 10 years old, Ecology reviewed the treatability data base, and information concerning the demonstrated removal efficiencies for Simpson's primary and secondary treatment system in order to establish that the federal effluent guidelines constitute AKART. Ecology concluded that any further treatment beyond secondary treatment would only add a few percentage points to the removal efficiencies for BOD_5 and TSS. Based on this review, Ecology determined that Simpson's secondary treatment is equivalent to AKART for conventional pollutants in this wastewater stream, and the technology-based limits in the federal effluent limitations guidelines are the appropriate limits.

Conventional Pollutants

Conventional pollutants addressed in 40 CFR include 5-day biochemical oxygen demand (BOD_5), total suspended solids (TSS), and pH. The loading allowances applicable to Simpson production are summarized as follows:

	BOD_5 monthly ave ($lb/T_{product}$)	**BOD_5 daily max ($lb/T_{product}$)**	**TSS monthly ave ($lb/T_{product}$)**	**TSS daily max ($lb/T_{product}$)**	**pH (range)**
Subpart B - bleached market pulp (NSPS)[a]	11.0	20.6	19.0	36.4	5.0-9.0
Subpart B - paperboard, coarse paper, & tissue paper (BPT)[b]	14.2	27.3	25.8	48.0	5.0-9.0
Subpart B - paperboard, coarse paper, & tissue paper (NSPS)[c]	9.2	17.0	15.2	29.2	5.0-9.0

Subpart C - unbleached kraft (BPT/BCT)[d]	5.6	11.2	12.0	24.0	6.0-9.0
Subpart J - paperboard from wastepaper, corrugating medium furnish (NSPS)[e]	4.2	7.8	4.6	8.8	5.0-9.0

[a] from 1998 Effluent Guidelines (40 CFR §430.22(a)). Note: in the previous permit this was referred to as Subcategory G.
[b] from 1998 Effluent Guidelines (40 CFR §430.22(a)). Note: in the previous permit this was referred to as Subcategory H.
[c] from 1998 Effluent Guidelines (40 CFR §430.25(a)). Note: in the previous permit this was referred to as Subcategory H.
[d] from 1998 Effluent Guidelines (40 CFR §430.32&33). Note: in the previous permit this was referred to as Subcategory A.
[e] from 1998 Effluent Guidelines (40 CFR §430.105). Note: in the previous permit this was referred to as Subcategory E.

Average production during the two year period from 10/1/05 to 9/30/07 provides the production base Ecology used to calculate the limits. Production rates for proposed permit limits are summarized in the following table.

	Proposed Permit Production Rate (ADT/D)
Subpart B - bleached market pulp (NSPS)	33
Subpart B - paperboard, coarse paper, & tissue paper (BPT)	115
Subpart B - paperboard, coarse paper, & tissue paper (NSPS)	301
Subpart C - unbleached kraft (BPT/BCT)	524
Subpart J - paperboard from wastepaper, corrugating medium furnish (NSPS)	510
Total	1483

Ecology calculated limits based on the loading allowances and production rates presented in the two previous tables. Technology based proposed permit limits are summarized in the following table.

	BOD_5 monthly ave (lb/D)	**BOD_5 daily max (lb/D)**	**TSS monthly ave (lb/D)**	**TSS daily max (lb/D)**	**pH (range)**
Technology based proposed limits	9840	18780	16800	32570	5.0-9.0[a]

[a] Indicates the range of permitted values. Excursions between 4.0 and 10.0 shall not be considered violations provided no single excursion exceeds 60 minutes in length and total excursions do not exceed 7 hours and 30 minutes per month. Any excursions below 4.0 or above 10.0 shall be

considered violations. The instantaneous maximum and minimum shall be reported monthly.

Non-conventional Pollutants

The 40 CFR effluent guidelines require limits for pentachlorophenol and trichlorophenol at facilities using chlorophenolic-containing biocides. Simpson does not use biocides containing chlorophenolic compounds. Thus, Ecology did not include limits in the proposed permit.

40 CFR §430.24 requires "best available technology economically achievable" for several pollutants. Concentration and loading limits are summarized as follows:

Bleach plant effluent (see 40 CFR §430.24(e) for location) must meet the following (see 40 CFR §430.24(a)(1) for limits):

Pollutant	Daily Maximum	Monthly Average
Tetrachlorocatechol	< 5.0 µg/L [a/]	-
Tetrachloroguaiacol	< 5.0 µg/L [a/]	-
Trichlorosyringol	< 2.5 µg/L [a/]	-
4,5,6-trichloroguaiacol	< 2.5 µg/L [a/]	-
3,4,6-trichlorocatechol	< 5.0 µg/L [a/]	-
3,4,5-trichlorocatechol	< 5.0 µg/L [a/]	-
3,4,5-trichloroguaiacol	< 2.5 µg/L [a/]	-
2,3,4,6-tetrachlorophenol	< 2.5 µg/L [a/]	-
3,4,6-trichloroguaiacol	< 2.5 µg/L [a/]	-
Pentachlorophenol	< 5.0 µg/L [a/]	-
2,4,6-trichlorophenol	< 2.5 µg/L [a/]	-
2,4,5-trichlorophenol	< 2.5 µg/L [a/]	-
2,3,7,8-TCDD [b/]	< 10 pg/L [a/]	-
2,3,7,8-TCDF [b/]	31.9 pg/L	-
Chloroform	0.0138 lb/ADTP[c]	0.0083 lb/ADTP[c]

[a] This concentration represents the minimum level (ML – as defined in 40 CFR 430.01(i)) for this pollutant.

[b] 2,3,7,8-TCDD is 2,3,7,8-tetrachlorodibenzo-p-dioxin and 2,3,7,8-TCDF is 2,3,7,8-tetrachlorodibenzofuran.

[c] air dried ton pulp (ADTP)

Final effluent (see 40 CFR §430.24(e) for location) must meet the following (see 40 CFR §430.24(a)(1) for limits):

Pollutant	Daily Maximum	Monthly Average
AOX	1.902 lb/ADTP	1.246 lb/ADTP

Chloroform and AOX limits are calculated using unbleached pulp entering the first stage of the bleach plant (see 40 CFR §430.01(n)(2)). In the period from 10/1/05 to 9/30/07, the average was 528 ADTP/D

(480 ADMT/D) of unbleached pulp. Proposed permit limits for AOX and Chloroform are presented in the following table.

Pollutant	Proposed Permit Daily Maximum (lb/D)	Proposed Permit Monthly Average (lb/D)
AOX	1004	657
Chloroform	7.3	4.4

Because of the variability of bleach plant loading, Simpson may sometimes exceed the AOX or chloroform lb/D limit. The permit specifies such cases are not considered violations if the lb/ADTP limits in 40 CFR §430.24(a)(1) are met.

C. Surface Water Quality-Based Effluent Limits

The Washington State Surface Water Quality Standards (chapter 173-201A WAC) were designed to protect existing water quality and preserve the beneficial uses of Washington's surface waters. Waste discharge permits must include conditions that ensure the discharge will meet established surface water quality standards (WAC 173-201A-510). Water quality-based effluent limits may be based on an individual waste load allocation or on a waste load allocation developed during a basin wide total maximum daily loading study (TMDL).

Numerical Criteria for the Protection of Aquatic Life and Recreation

Numerical water quality criteria are published in the Water Quality Standards for Surface Waters (chapter 173-201A WAC). They specify the levels of pollutants allowed in receiving water to protect aquatic life and recreation in and on the water. Ecology uses numerical criteria along with chemical and physical data for the wastewater and receiving water to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limits, the discharge must meet the water quality-based limits.

Numerical Criteria for the Protection of Human Health

The U.S. EPA has published 91 numeric water quality criteria for the protection of human health that are applicable to dischargers in Washington State (40 CFR 131.36). These criteria are designed to protect humans from exposure to pollutants linked to cancer and other diseases, based on consuming fish and shellfish and drinking contaminated surface waters. The Water Quality Standards also include radionuclide criteria to protect humans from the effects of radioactive substances.

Narrative Criteria

Narrative water quality criteria (e.g., WAC 173-201A-240(1); 2006) limit the toxic, radioactive, or other deleterious material concentrations that the facility may discharge to levels below those which have the potential to:

- Adversely affect designated water uses.

- Cause acute or chronic toxicity to biota.
- Impair aesthetic values.
- Adversely affect human health.

Narrative criteria protect the specific designated uses of all fresh waters (WAC 173-201A-200,; 2006) and of all marine waters (WAC 173-201A-210,; 2006) in the State of Washington.

Antidegradation

The purpose of Washington's Antidegradation Policy (WAC 173-201A-300-330; 2006) is to:

- Restore and maintain the highest possible quality of the surface waters of Washington.
- Describe situations under which water quality may be lowered from its current condition.
- Apply to human activities that are likely to have an impact on the water quality of surface water.
- Ensure that all human activities likely to contribute to a lowering of water quality, at a minimum, apply all known, available, and reasonable methods of prevention, control, and treatment (AKART).
- Apply three Tiers of protection (described below) for surface waters of the state.

Tier I ensures existing and designated uses are maintained and protected and applies to all waters and all sources of pollutions. Tier II ensures that waters of a higher quality than the criteria assigned are not degraded unless such lowering of water quality is necessary and in the overriding public interest. Tier II applies only to a specific list of polluting activities. Tier III prevents the degradation of waters formally listed as "outstanding resource waters," and applies to all sources of pollution.

A facility must prepare a Tier II analysis when all three of the following conditions are met:

- The facility is planning a new or expanded action.
- Ecology regulates or authorizes the action.
- The action has the potential to cause measurable degradation to existing water quality at the edge of a chronic mixing zone.

Since Simpson increased production by greater than 10%, Ecology must consider a Tier II analysis in accordance with its Supplementary Guidance - *Implementing the Tier II Antidegradation Rules (WAC 173-201A-320).* A Tier II analysis is required if a measurable change is caused or expected to be caused. In the context of WAC 173-201A-320(3), a measurable change includes a:

(a) Temperature increase of 0.3°C or greater;
(b) Dissolved oxygen decrease of 0.2 mg/L or greater;
(c) Bacteria level increase of 2 cfu/100 mL or greater;
(d) pH change of 0.1 units or greater;
(e) Turbidity increase of 0.5 NTU or greater; or

(f) Any detectable increase in the concentration of a toxic or radioactive substance.

Ecology makes a measurable change determination at the edge of the maximum calculated chronic mixing zone. The chronic dilution factor for the Simpson discharge is 87.

Information used to determine if a measurable change is expected included:

		Previous Permit	Proposed Permit	Source
Flow	(ave - MGD)	27	29	application
Temperature	(ave - °C)	35.0	36.1	application
BOD_5	(daily max - lb/D)	16305	18780	limit
BOD_5	(daily max conc at ave flow - mg/L)	72	78	calculation
TSS	(daily max - lb/D)	28651	32750	limit
TSS	(daily max conc at ave flow - mg/L)	127	135	calculation
Bacteria	(cfu/100 ml)	--	none detected	application
pH	(range - S.U.)	5.0 - 9.0	5.2 - 9.0	limit
Turbidity	(NTU)	--	38	application

Temperature

Ecology calculated the potential temperature difference using the average effluent temperatures and the $T_{ambient}$ temperature used for previous temperature calculations in this fact sheet:

2001 T_{mix} $= T_{ambient} + (T_{average} - T_{ambient})/DF.$
$= 14.47°C + (35°C - 14.47°C)/87$
$= 14.71°C$

2008 T_{mix} $= T_{ambient} + (T_{average} - T_{ambient})/DF.$
$= 14.47°C + (36.1°C - 14.47°C)/87$
$= 14.72°C$

Where:
T_{mix} = the temperature at the edge of the chronic mixing zone.
$T_{ambient}$ = the background water temperature colder than the threshold criterion.
$T_{average}$ = average effluent temperature.
DF = the chronic dilution factor at the critical condition.

The estimated increase in receiving water temperature due to the increase in production is 0.01°C. The expected impact on temperature is less than the defined measurable amount (0.3°C). A Tier II analysis for temperature is not required.

Dissolved Oxygen:

Ecology estimated the impact due to oxygen demand by first calculating effluent BOD_5 concentrations using daily maximum load limit and average daily flow (see previous table for values). The increased production results in an estimated BOD_5 concentration increase of 6 mg/l in the effluent and potential 0.07 mg/l dissolved oxygen decrease at the edge of the chronic mixing zone. The expected impact on dissolved oxygen is less than the defined measurable amount (0.2 mg/L). A Tier II analysis for dissolved oxygen is not required.

Bacteria

Fecal coliform bacteria were not detected in Simpson effluent. There is no expected impact on bacteria due to increases in mill production. The expected impact on bacteria is less than the defined measurable amount (2 cfu/100 mL). A Tier II analysis for bacteria is not required.

pH

Ecology considered effluent pH in the water quality based limits discussion of this fact sheet. The proposed permit increases the minimum pH limit from 5.0 for the previous permit term to 5.2. The new limit should reduce potential pH impact compared to the old limit. The expected impact on pH is less than the defined measurable amount (0.1 units). A Tier II analysis for pH is not required.

Turbidity

Simpson measured an average effluent turbidity of 38 NTU during the previous permit term. Simpson uses turbidity as an indicator of TSS concentration to more promptly detect mill upsets. Ecology estimated the impact on potential TSS discharged by first calculating effluent TSS concentrations using daily maximum load limit and average daily flow (see previous table for values). The increased production results in a potential estimated TSS concentration increase of 6%. A proportionate turbidity increase would result in an increase of 2 NTU in the effluent and 0.02 NTU at the edge of the chronic mixing zone. The expected impact on turbidity is less than the defined measurable amount (0.5 NTU). A Tier II analysis for turbidity is not required.

Toxic or Radioactive Substances

Simpson did not make substantial process changes to achieve the production increase. Thus, Ecology does not expect substantial changes in the nature of the effluent. The effluent scan and whole effluent toxicity information presented elsewhere in this fact sheet did not suggest toxic or radioactive substances were a problem. Detectable increases of toxic or radioactive substances are not expected at the edge of the chronic mixing zone. A Tier II analysis for toxic or radioactive substances is not required.

Review of the Tier II criteria found no expected measurable change in water quality associated with the production increases and the resulting changes in effluent limits. Thus, the proposed permit complies with Tier II Antidegradation Rules and Ecology will not require Simpson to conduct any further Tier II analysis.

This facility must meet Tier I requirements.

- Existing and designated uses must be maintained and protected. No degradation may be allowed that would interfere with, or become injurious to, existing or designated uses, except as provided for in this chapter.

Ecology's analysis described in this section of the fact sheet demonstrates that the existing and designated uses of the receiving water will be protected under the conditions of the proposed permit.

Mixing Zones

A mixing zone is the defined area in the receiving water surrounding the discharge port(s), where wastewater mixes with receiving water. Within mixing zones the pollutant concentrations may exceed water quality numeric criteria, so long as the diluting wastewater doesn't interfere with designated uses of the receiving water body (e.g., recreation, water supply, and aquatic life and wildlife habitat, etc.). The pollutant concentrations outside of the mixing zones must meet water quality numeric criteria.

State and federal rules allow mixing zones because the concentrations and effects of most pollutants diminish rapidly after discharge, due to dilution. Ecology defines mixing zone sizes to limit the amount of time any exposure to the end-of-pipe discharge could harm water quality, plants, or fish.

The state's water quality standards allow Ecology to authorize mixing zones for the facility's permitted wastewater discharges only if those discharges already receive all known, available, and reasonable methods of prevention, control and treatment (AKART). Mixing zones typically require compliance with water quality criteria within 200 to 300 feet from the point of discharge; and use no more than 25% of the available width of the water body for dilution. We use modeling to estimate the amount of mixing within the mixing zone. Through modeling we determine the potential for violating the water quality standards at the edge of the mixing zone and derive any necessary effluent limits. Steady-state models are the most frequently used tools for conducting mixing zone analyses. Ecology chooses values for each effluent and for receiving water variables that correspond to the time period when the most critical condition is likely to occur (see Ecology's Permit Writer's Manual). Each critical condition parameter (by itself) has a low probability of occurrence and the resulting dilution factor is conservative. The term "reasonable worst-case" applies to these values.

The mixing zone analysis produces a numerical value called a dilution factor (DF). A dilution factor represents the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. For example, a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water comprises 90% of the total volume at the boundary of the mixing zone. We use dilution factors with the water quality criteria to calculate reasonable

potentials and effluent limits. Water quality standards include both aquatic life-based criteria and human health-based criteria. The former are applied at both the acute and chronic mixing zone boundaries; the latter are applied only at the chronic boundary. The concentration of pollutants at the boundaries of any of these mixing zones may not exceed the numerical criteria for that zone.

Each aquatic life **acute** criterion is based on the assumption that organisms are not exposed to that concentration for more than one-hour and more often than one exposure in three years. Each aquatic life **chronic** criterion is based on the assumption that organisms are not exposed to that concentration for more than four consecutive days and more often than once in three years.

The two types of human health-based water quality criteria distinguish between those pollutants linked to non-cancer effects (non-carcinogenic) and those linked to cancer effects (carcinogenic). The human health-based water quality criteria incorporate several exposure and risk assumptions. These assumptions include:

- A 70-year lifetime of daily exposures.
- An ingestion rate for fish or shellfish measured in kg/day.
- An ingestion rate of two liters/day for drinking water
- A one-in-one-million cancer risk for carcinogenic chemicals.

This permit authorizes a small acute mixing zone, surrounded by a chronic mixing zone around the point of discharge (WAC 173-201A-400; 2006). The water quality standards impose certain conditions before allowing the discharger a mixing zone:

1. Ecology must specify both the allowed size and location in a permit.

The proposed permit specifies the size and location of the allowed mixing zone.

2. The facility must fully apply "all known available and reasonable methods of prevention, control and treatment" (AKART) to its discharge.

Ecology has determined that the treatment provided and the pollution prevention activities practiced at Simpson meet the requirements of AKART (see "Technology based Limits").

3. Ecology must consider critical discharge conditions.

Surface water quality-based limits are derived for the water body's critical condition, (the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or designated water body uses). The critical discharge condition is often pollutant-specific or water body-specific.

Critical discharge conditions are those conditions that result in reduced dilution or increased effect of the pollutant. Factors affecting dilution include the depth of water, the density stratification in the water column, the currents and the rate of discharge. Density stratification is determined by the salinity and temperature of the receiving water. Temperatures are warmer in the surface waters in summer. Therefore, density stratification is generally greatest during the

summer months. Density stratification affects how far up in the water column a freshwater plume may rise. The rate of mixing is greatest when an effluent is rising. The effluent stops rising when the mixed effluent is the same density as the surrounding water. After the effluent stops rising, the rate of mixing is much more gradual. Water depth can affect dilution when a plume might rise to the surface when there is little or no stratification. Ecology uses the water depth at mean lower low water (MLLW) for marine waters. Ecology's Permit Writer's Manual describes additional guidance on criteria/design conditions for determining dilution factors. The Manual can be obtained from Ecology's website at: http://www.ecy.wa.gov/biblio/92109.html.

Ecology used the following critical conditions to model the discharge:

- Water depth at MLLW of 57.5 feet.
- Density profile with a difference of 3.2607 sigma-t units between 57.5 feet and the surface.
- 50^{th} percentile current speeds of 10 cm/sec for chronic and human health mixing zones.
- 10^{th} or 90^{th} percentile current speeds of 6 cm/sec for acute mixing zone.
- Maximum average monthly effluent flow of 36.22 MGD for chronic and human health non-carcinogen.
- Annual average flow of 30.19 MGD for human health carcinogen.
- Maximum daily flow of 36.22 million gallons per day (MGD) for acute mixing zone.
- 1 DAD MAX Effluent temperature of 14.47^{o}C.

Ambient data at critical conditions in the vicinity of the outfall was taken from analysis conducted in 2000.

4. Supporting information must clearly indicate the mixing zone would not:

- **Have a reasonable potential to cause the loss of sensitive or important habitat,**
- **Substantially interfere with the existing or characteristic uses,**
- **Result in damage to the ecosystem, or**
- **Adversely affect public health.**

Ecology established Washington State water quality criteria for toxic chemicals using EPA criteria. EPA developed the criteria using toxicity tests with numerous organisms, and set the criteria to protect all aquatic species.

EPA sets acute criteria for toxic chemicals assuming organisms are exposed to the pollutant at the criteria concentration for 1-hour. They set chronic criteria assuming organisms are exposed to the pollutant at the criteria concentration for 4 days. Dilution modeling under critical conditions generally shows that both acute and chronic criteria concentrations are reached within minutes of being discharged.

The discharge plume does not impact drifting and non-strong swimming organisms because they cannot stay in the plume close to the outfall long enough to be affected. Strong swimming fish could maintain a position within the plume, but they can also avoid the discharge by swimming away. Mixing zones generally do not affect benthic organisms (bottom dwellers) because the buoyant plume rises in the water column. Ecology has additionally determined that this effluent

will not exceed 33 degrees C for more than 2 seconds after discharge; and that the temperature of the water will not create lethal conditions or blockages to fish migration.

Ecology evaluates the cumulative toxicity of an effluent by testing the discharge with whole effluent toxicity (WET) testing.

Ecology reviewed the above information, the specific information on the characteristics of the discharge, the receiving water characteristics and the discharge location. Based on this review we conclude that the discharge does not have a reasonable potential to cause the loss of sensitive or important habitat, substantially interfere with existing or characteristics uses, result in damage to the ecosystem or adversely affect public health

5. The discharge/receiving water mixture must not exceed water quality criteria outside the boundary of a mixing zone.

Ecology conducted a reasonable potential analysis, using procedures established by the EPA and by Ecology, for each pollutant. We concluded the discharge/receiving water mixture will not violate water quality criteria outside the boundary of the mixing zone.

6. The size of the mixing zone and the concentrations of the pollutants must be minimized.

At any given time, the effluent plume uses only a portion of the acute and chronic mixing zone, which minimizes the volume of water involved in mixing. Because tidal currents change direction, the plume orientation within the mixing zone changes. The plume rises through the water column as it mixes therefore much of the receiving water volume at lower depths in the mixing zone is not mixed with discharge. Similarly, because the discharge may stop rising at some depth due to density stratification, waters above that depth will not mix with the discharge. Ecology determined it is impractical to specify in the permit the actual, much more limited volume in which the dilution occurs as the plume rises and moves with the current.

Ecology minimizes the size of mixing zones by requiring dischargers to install diffusers when they are appropriate to the discharge and the specific receiving waterbody. When a diffuser is installed the discharge and the receiving water is more completely mixed in a shorter time period. Ecology also minimizes the size of the mixing zone (in the form of the dilution factor) using design criteria with a low probability of occurrence. For example, Ecology uses the expected 95^{th} percentile pollutant concentration, the 90^{th} percentile background concentration, the centerline dilution factor and the lowest flow occurring once in every 10 years to perform the reasonable potential analysis.

The facility continues to conduct pollution prevention activities and has completed pollution prevention projects. These activities also minimize the concentrations of pollutants in the discharge.

Because of the above reasons, Ecology has effectively minimized the size of the mixing zone authorized in the proposed permit.

7. Maximum size of mixing zone.

The authorized mixing zone does not exceed the maximum size restriction.

8. Acute Mixing Zone.

- **The discharge/receiving water mixture must comply with acute criteria as near to the point of discharge as practicably attainable.**
  Ecology determined the acute criteria will be met at 10% of the distance of the chronic mixing zone.

- **The pollutant concentration, duration and frequency of exposure to the discharge, will not create a barrier to migration or translocation of indigenous organisms to a degree that has the potential to cause damage to the ecosystem.**
  As described above the toxicity of any pollutant depends upon the exposure, the pollutant concentration and the time the organism is exposed to that concentration. Authorizing a limited acute mixing zone for this discharge assures that it will not create a barrier to migration. The effluent from this discharge will rise as it enters the receiving water, assuring that the rising effluent will not cause translocation of indigenous organism near the point of discharge (below the rising effluent).

- **Comply with size restrictions.**
  The mixing zone authorized for this discharge complies with the size restrictions published in chapter 173-201A WAC.

9. Overlap of Mixing Zones.

This mixing zone does not overlap another mixing zone.

D. Description of the Receiving Water

The facility discharges to inner Commencement Bay, a marine estuarine water. The ambient background data used for this permit includes the following:

Ambient Background Data

Parameter	Value used	Source
Temperature (highest annual 1-DADMax)	14.47^{o}C	EAP, 2006
pH - (min / max)	7.7 / 8.4	EAP, 2006
Dissolved Oxygen (min)	6.5 mg/L	EAP, 2007
Total Ammonia-N (ave)	0.024 mg/L	EAP, 2005
Fecal Coliform (max)	20/100 mL	EAP, 2005
Salinity (ave)	29.31 sigma-t	EAP, 2007
Copper (dissolved - max)	0.90 ug/L	Ecology, 1999

Nickel (dissolved - max)	0.48 ug/L	Ecology, 1999
Zinc (dissolved - max)	2.1 ug/L	Ecology, 1999

EAP (Ecology Environmental Assessment Program), 2007. Long-term marine water quality data., Station CMB003 - Commencement Bay - Browns Point, 2007 data.
EAP (Ecology Environmental Assessment Program), 2006. Long-term marine water quality data., Station CMB003 - Commencement Bay - Browns Point, 2006 data.
EAP (Ecology Environmental Assessment Program), 2005. Long-term marine water quality data., Station CMB003 - Commencement Bay - Browns Point, 2005 data.
Ecology, 1999. *Metals Concentrations in Commencement Bay Waterways During 1997 - 1998*. February 1999. Publication No. 99-308.

E. Designated Uses and Surface Water Quality Criteria

Applicable designated uses and surface water quality criteria are defined in chapter 173-201A WAC. In addition, the U.S. EPA set human health criteria for toxic pollutants (40 CFR 131.36). Criteria applicable to this facility's discharge are summarized below.

- Aquatic life uses are designated using the following general categories. All indigenous fish and non-fish aquatic species must be protected in waters of the state.

  (a) **Extraordinary quality** salmonid and other fish migration, rearing, and spawning; clam, oyster, and mussel rearing and spawning; crustaceans and other shellfish (crabs, shrimp, crayfish, scallops, etc.) rearing and spawning.
  (b) **Excellent quality** salmonid and other fish migration, rearing, and spawning; clam, oyster, and mussel rearing and spawning; crustaceans and other shellfish (crabs, shrimp, crayfish, scallops, etc.) rearing and spawning.
  (c) **Good quality** salmonid migration and rearing; other fish migration, rearing, and spawning; clam, oyster, and mussel rearing and spawning; crustaceans and other shellfish (crabs, shrimp, crayfish, scallops, etc.) rearing and spawning.
  (d) **Fair quality** salmonid and other fish migration.

  Commencement Bay in the area of the Simpson outfall is rated "good quality." The Aquatic Life Uses for this receiving water are identified below.

Aquatic Life Uses & Associated Criteria (Good Quality)

Temperature Criteria – Highest 1D MAX	19°C (66.2°F)
Dissolved Oxygen Criteria – Lowest 1 Day Minimum	5.0 mg/L
Turbidity Criteria	• 10 NTU over background when the background is 50 NTU or less; or • A 20 percent increase in turbidity when the background turbidity is more than 50 NTU.
pH Criteria	pH must be within the range of 7.0 to 8.5 with a human-caused variation within the above

	range of less than 0.5 units.

- To protect **shellfish harvesting**, fecal coliform organism levels must not exceed a geometric mean value of 14 colonies/100 mL, and not have more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 43 colonies/100 mL.

- The **recreational use** is secondary contact recreation.

The recreational uses for this receiving water are identified below.

Recreational Uses & Associated Criteria

Recreational use	Criteria
Secondary Contact Recreation	Enterococci organism levels must not exceed a geometric mean value of 70 colonies/100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 208 colonies/100 mL.

- The **miscellaneous marine water uses** are wildlife habitat, harvesting, commerce and navigation, boating, and aesthetics.

The 303(d) list notes water quality limited waters and parameters causing the limitations. The 2002/2004 303(d) list includes dieldrin and total PCBs in tissue as pollutants of most concern in Inner Commencement Bay. Neither pollutant was detected in Simpson effluent.

F. Evaluation of Surface Water Quality -Based Effluent Limits for Numeric Criteria

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near field) or at a considerable distance from the point of discharge (far field). Toxic pollutants, for example, are near-field pollutants--their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as biochemical oxygen demand (BOD) is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating surface water quality-based effluent limits varies with the point at which the pollutant has its maximum effect.

Pollutant concentrations in the proposed discharge exceed water quality criteria despite using technology-based controls which Ecology determined fulfills AKART. Ecology therefore authorizes a mixing zone in accordance with the geometric configuration, flow restriction, and other restrictions imposed on mixing zones described in chapter 173-201A WAC.

The diffuser at Outfall 001 is approximately180 feet long with a diameter of 54 inches. The diffuser has a total of 29 eight inch diameter ports. The distance between ports is six feet. The mean lower low water (MLLW) depth at the diffuser is 57.5 feet. Ecology obtained this information from the Dilution Ratio Study Report submitted in 1994 and re-reviewed in 2000.

In late 2007 Simpson discovered one of the diffuser ports was damaged. Two more diffuser ports were damaged after the initial damage was discovered. Temporary repairs were made to

seal the damaged areas of the outfall line. Permanent repairs to the outfall line, including replacing the diffuser ports, are being planned. Simpson is also working with local maritime companies and the Coast Guard to help prevent future damage.

Chronic Mixing Zone

WAC 173-201A-400(7)(b) specifies that mixing zones must not extend in any horizontal direction from the discharge ports for a distance greater than 200 feet plus the depth of water over the discharge ports as measured during MLLW.

The horizontal distance of the chronic mixing zone is 257 feet. The mixing zone extends from the seabed to the top of the water surface.

Acute Mixing Zone

WAC 173-201A-400(8)(b) specifies that in estuarine waters a zone where acute criteria may be exceeded must not extend beyond 10% of the distance established for the chronic zone. The acute mixing zone for Outfall 001 extends 26 feet in any spatial direction from any discharge port.

Ecology determined the dilution factors of effluent to receiving water that occur within these zones at the critical condition using the PLUMES model. The dilution factors are as follows:

Dilution Factors (DF)

Criteria	Acute	Chronic
Aquatic Life	27	87
Human Health, Carcinogen		87
Human Health, Non-carcinogen		87

Ecology determined the impacts of oxygen demand, temperature, pH, fecal coliform, turbidity, and toxic pollutants as described below, using the dilution factors in the above table. The derivation of surface water quality-based limits also takes into account the variability of pollutant concentrations in both the effluent and the receiving water.

BOD_5--This discharge (with technology-based limits) results in an amount of BOD loading relative to the large amount of dilution occurring in the receiving water at critical conditions. Technology-based limits will ensure that dissolved oxygen criteria are met in the receiving water.

Temperature--The state temperature standards include multiple criteria, each with different durations of exposure and points of application. Ecology evaluates each criterion independently to determine reasonable potential and permit limits.

- Temperature Chronic Effects

  a) Annual summer maximum.

  The annual maximum temperature criteria (19°C) protects specific categories of aquatic life by controlling the effect of human actions on summer temperatures.

  This criteria must be met at the edge of the chronic mixing zone boundary.

Marine water criteria are expressed as the highest one-day annual maximum temperature (1-DMax).

Ecology calculated the reasonable potential for the discharge to exceed the annual summer maximum at the edge of the chronic mixing zone ($T_{chronic}$) during critical condition(s):

$T_{chronic} = T_{ambient90} + (T_{effluent95} - T_{ambient90})/DF.$
$= 14.47°C + (38.9°C - 14.47°C)/87$
$= 14.75°C$

Where:
$T_{ambient}$ = the background water temperature colder than the threshold criterion.
$T_{effluent95}$ = 95th percentile 1-Dmax effluent temperature (maximum daily effluent temperature used in this case).
DF = the chronic dilution factor at the critical condition.

Ecology used the highest ambient value rather than the 90% value making the analysis more conservative. Since $T_{chronic}$ is less than 19°C, the discharge meets water quality standards and an effluent limit is not needed

b) Incremental warming criteria

The water quality standards limit the amount of warming human sources can cause at any time water temperatures are cooler than the assigned threshold criteria. This criterion is designed to provide protection for the overall temperature regime.

The discharge is only allowed to warm the water by a defined increment (t) when the background (ambient) temperature is cooler than the assigned threshold criterion. The calculated incremental temperature allowance is added to the ambient temperature and the sum is compared to the temperature at the edge of the chronic mixing zone boundary ($T_{chronic}$). Ecology only allows warming increments as long as they do not cause temperatures to exceed either the annual maximum or supplemental spawning criteria. Criteria may be applied as a change in the receiving water's 7-DADMax temperature.

Ecology calculated the incremental temperature allowance (t) using the Incremental Warming Criteria Marine Water Equation.

$t = 12/(T_{ambient} - 2)$
$= 12/(14.47°C - 2)$
$= 0.96°C$

$T_{ambient90} + t = 14.47°C + 0.96°C$
$= 15.43°C$

Since $T_{chronic}$ calculated in this section (14.75°C is less than $T_{ambient} + t$ (15.43°C), the discharge meets water quality standards and an effluent limit is not needed

- Temperature Acute Effects

a) Instantaneous lethality to passing fish.
The upper 99th percentile daily maximum effluent temperature must not exceed 33°C; unless a dilution analysis indicates ambient temperatures will not exceed 33°C 2-seconds after discharge. The near-field dilution analysis has been conducted and no reasonable potential exists since the plume temperature is less than 33°C two seconds after discharge.

Ecology calculated the plume temperature two seconds after discharge using the following equation:

$T_{2sec} = T_{ambient90} + (T_{effluent99} - T_{ambient90})/(DF@2seconds)$.
$T_{2sec} = 14.47°C + (38.9°C - 14.47°C)/(5.4)$.
$T_{2sec} = 19.0°C$.

Where:
T_{2sec} = plume temperature 2-seconds after discharge.
$T_{ambient90}$ = 90th percentile of annual maximum 1DMax background temperatures. (Note: maximum temperature used in calculation).
$T_{effluent99}$ = 99th percentile of maximum 1DMax effluent temperatures. (Note: maximum temperature used in calculation).
DF@2seconds = centerline dilution factor at 2 seconds plume travel during a 7Q10 period.

b) General lethality and migration blockage.
Measurable (0.3°C) increases in temperature at the edge of a chronic mixing zone are not allowed when the receiving water temperature exceeds either a 1DMax of 23°C or a 7DADMax of 22°C. The 1DMax receiving water temperature was 14.47°C. The 7DADMax is less than the 1DMax. The temperatures meet these criteria.

pH-- Technology-based limits for the discharge are 5.0 to 9.0. Ecology modeled the impact of the effluent pH on the receiving water based on the CO2SYS program (Lewis and Wallace, 1998). The chronic dilution factor of 87 was used. A copy of the results in included in Appendix C.

At critical conditions, the human caused variation due to a discharge pH of 5.0 was predicted to be greater than the criteria allowing a maximum change of less than 0.5 units. Therefore, Ecology placed water quality based effluent limits of 5.2 to 9.0 (instead of the technology-based limits) in the permit to protect the pH of the receiving water.

Fecal Coliform-- Fecal coliform bacteria were not detected in the Simpson effluent.

Turbidity-- Ecology evaluated the impact of turbidity based on the range of turbidity in the effluent. Average mill effluent turbidity of the treated mill effluent was 38 NTUs. Due to the large degree of dilution, Ecology expects no violations of the turbidity criteria outside the designated mixing zone due to the discharge.

Toxic Pollutants-- Federal regulations (40 CFR 122.44) require Ecology to place limits in NPDES permits on toxic chemicals in an effluent whenever there is a reasonable potential for

those chemicals to exceed the surface water quality criteria. Ecology does not exempt facilities with technology-based effluent limits from meeting the surface water quality standards.

Ecology compared the potentially toxic pollutants noted in the "Effluent Characterization" section of this fact sheet to toxicity criteria (Appendix C). This initial screening determined concentrations of ammonia, copper, nickel, and zinc might possibly be toxic in the unmixed effluent. Ecology then conducted a reasonable potential analysis on ammonia, copper, nickel, and/or zinc to determine if they pose a reasonable potential to exceed the water quality criteria at the critical condition using procedures given in EPA, 1991 (Appendix C).

Valid ambient background data was available for all four parameters. Calculations using all applicable data show no reasonable potential for this discharge to cause a violation of water quality standards. Ecology's determination assumes that this facility meets the other effluent limits of this permit.

G. Whole Effluent Toxicity

The water quality standards for surface waters forbid discharge of effluent that causes toxic effects in the receiving waters. Many toxic pollutants cannot be measured by commonly available detection methods. However, laboratory tests can measure toxicity directly, by exposing living organisms to the wastewater and measuring their responses. These tests measure the aggregate toxicity of the whole effluent, so this approach is called whole effluent toxicity (WET) testing. Some WET tests measure acute toxicity and other WET tests measure chronic toxicity.

- *Acute toxicity tests measure mortality as the significant response* to the toxicity of the effluent. Dischargers who monitor their wastewater with acute toxicity tests find early indications of any potential lethal effect of the effluent on organisms in the receiving water.

- *Chronic toxicity tests measure various sublethal toxic responses* such as retarded growth or reduced reproduction. Chronic toxicity tests often involve either a complete life cycle test on an organism with an extremely short life cycle, or a partial life cycle test during a critical stage of a test organism's life. Some chronic toxicity tests also measure organism survival.

Ecology-accredited WET testing laboratories use the proper WET testing protocols, fulfill the data requirements, and submit results in the correct reporting format. Accredited laboratory staff know about WET testing and how to calculate an NOEC, LC_{50}, EC_{50}, IC_{25}, etc. Ecology gives all accredited labs the most recent version of Ecology Publication # WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria* (http://www.ecy.wa.gov/biblio/9580.html), which is referenced in the permit. Ecology recommends that Simpson send a copy of the acute or chronic toxicity sections(s) of its NPDES permit to the laboratory.

Simpson conducted acute WET tests during the previous permit cycle. Results were as follows.

ACUTE TEST RESULTS

Sample	Test Organism	Test Endpoint	NOEC	LOEC

date				
07/20/05	Rainbow Trout	96 hr Survival Rate	100	>100
08/09/05	Fathead Minnow	96 hr Survival Rate	100	>100
11/28/05	Rainbow Trout	96 hr Survival Rate	100	>100
11/30/05	Fathead Minnow	96 hr Survival Rate	50	100

SURVIVAL IN 100% EFFLUENT TESTS

Sample date	Test Organism	Test Endpoint	% survival in 100% effluent
7/20/05	Rainbow Trout	96 hr Survival Rate	100
8/9/05	Fathead Minnow	96 hr Survival Rate	67.5
11/28/05	Rainbow Trout	96 hr Survival Rate	100
11/30/05	Fathead Minnow	96 hr Survival Rate	82.5

The WET performance standards for acute toxicity are:

- a median of at least 80% survival in 100% effluent, and
- no single test with less than 65% survival in 100% effluent.

The results of Simpson tests were a median of 91% survival and a lowest survival rate of 67.5%. Thus, WET testing conducted during effluent characterization showed no reasonable potential for effluent discharges to cause receiving water acute toxicity. The proposed permit will not impose an acute WET limit. Simpson must retest the effluent before submitting an application for permit renewal. In addition,

- If this facility makes process or material changes which, in Ecology's opinion, increase the potential for effluent toxicity, then Ecology may (in a regulatory order, by permit modification, or in the permit renewal) require the facility to conduct additional effluent characterization.

- If WET testing conducted for submittal with a permit application fails to meet the performance standards in WAC 173-205-020, Ecology will assume that effluent toxicity has increased. Simpson may demonstrate to Ecology that effluent toxicity has not increased, by performing additional WET testing after the process or material changes have been made.

Simpson also conducted chronic WET tests during the previous permit cycle. Results were as follows.

CHRONIC TEST RESULTS

Sample date	Test Organism	Test Endpoint	NOEC	LOEC
07/18/05	Purple Sea Urchin	Fertilization Rate	70	>70
07/18/05	Topsmelt	7 day Survival Rate	60	>60
07/18/05	Topsmelt	Mean Dry Biomass	60	>60
07/18/05	Topsmelt	Mean Dry Weight	60	>60

09/07/05	Mussel	Development Rate	3.7	12.5
11/28/05	Mussel	Development Rate	3.7	12.5
11/28/05	Mussel	Survival Rate	65	>65
11/30/05	Purple Sea Urchin	Fertilization Rate	25	65
02/20/06	Inland Silverside	7 day Survival Rate	25	60
02/20/06	Inland Silverside	Mean Dry Biomass	60	>60
02/20/06	Inland Silverside	Mean Dry Weight	60	>60

The WET performance standard for chronic toxicity is no observed toxicity in a concentration of effluent representing the edge of the acute mixing zone. The Simpson acute dilution factor is 27, resulting in an expected effluent concentration of 3.7% at the edge of the acute mixing zone at critical receiving water conditions. The lowest no observable effects concentration (NOEC) for the Simpson chronic tests was 3.7% effluent in the mussel development test. Thus, WET testing conducted during effluent characterization showed no reasonable potential for effluent discharges to cause receiving water chronic toxicity. The proposed permit will not impose a chronic WET limit. Simpson must retest the effluent before submitting an application for permit renewal. In addition,

- If this facility makes process or material changes which, in Ecology's opinion, increase the potential for effluent toxicity, then Ecology may (in a regulatory order, by permit modification, or in the permit renewal) require the facility to conduct additional effluent characterization
- If WET testing conducted for submittal with a permit application fails to meet the performance standards in WAC 173-205-020, Ecology will assume that effluent toxicity has increased. Simpson may demonstrate to Ecology that effluent toxicity has not increased by performing additional WET testing after the process or material changes have been made.

H. Human Health

Washington's water quality standards include 91 numeric human health-based criteria that Ecology must consider when writing NPDES permits. These criteria were established in 1992 by the U.S. EPA in its National Toxics Rule (40 CFR 131.36). The National Toxics Rule allows states to use mixing zones to evaluate whether discharges comply with human health criteria.

Ecology determined the effluent may contain chemicals of concern posing a risk to human health. Ecology determined this because data or process information indicate regulated chemicals occur in the discharge.

Ecology conducted a determination of the discharge's potential to violate the water quality standards as required by 40 CFR 122.44(d). We followed the procedures published in the Technical Support Document for Water Quality-Based Toxics Control (EPA/505/2-90-001) and Ecology's Permit Writer's Manual (Ecology Publication 92-109, July, 2006) to make this reasonable potential determination. Our evaluation showed that the discharge has no reasonable potential to cause a violation of water quality standards, all concentrations in the mill effluent were less than human health criteria (see Appendix C). Thus, an effluent limit is not warranted.

I. Sediment Quality

The aquatic sediment standards (chapter 173-204 WAC) protect aquatic biota and human health. Under these standards Ecology may require a facility to evaluate the potential for its discharge to cause a violation of sediment standards (WAC 173-204-400).

Simpson conducted sediment sampling in the outfall area in 1987 and 2004. After review of the data submitted, the Aquatic Land Cleanup Unit of the Ecology Toxics Cleanup Program recommended that the permit not require sediment sampling with this renewal. Little or no change in discharger characteristics and effluent characteristics since the last sediment sampling support this recommendation. Therefore, the proposed permit does not include sediment sampling.

J. Ground Water Quality Limits

The Ground Water Quality Standards, (chapter 173-200 WAC), protect beneficial uses of ground water. Permits issued by Ecology must not allow violations of those standards (WAC 173-200-100).

Simpson does not discharge wastewater to ground and therefore we imposed no permit limits to protect ground water.

K. Comparison Of Effluent Limits With Limits of The Previous Permit Issued on November 1, 2001.

The previous and proposed permit limits for conventional pollutants are compared in the following table.

Comparison of Effluent Limits for Conventional Pollutants

	BOD_5 mthly ave (lb/D)	BOD_5 daily max (lb/D)	TSS mthly ave (lb/D)	TSS daily max (lb/D)	pH (range)
Proposed permit limits	9840	18780	16800	32570	5.2-9.0[a]
Previous permit limits	8502	16305	14752	28651	5.0-9.0[b]
Basis of Proposed limit	Technology	Technology	Technology	Technology	Water Quality
Basis of Previous limit	Technology	Technology	Technology	Technology	Technology

[a] Indicates the range of permitted values. Excursions between 4.2 and 10.0 shall not be considered violations provided no single excursion exceeds 60 minutes in length and total excursions do not exceed 7 hours and 30 minutes per month. Any excursions below 4.0 or above 10.0 shall be considered violations. The instantaneous maximum and minimum shall be reported monthly.

[b] Indicates the range of permitted values. Excursions between 4.0 and 10.0 shall not be considered violations provided no single excursion

exceeds 60 minutes in length and total excursions do not exceed 7 hours and 30 minutes per month. Any excursions below 4.0 or above 10.0 shall be considered violations. The instantaneous maximum and minimum shall be reported monthly.

Both BOD_5 and TSS limit increases in the proposed permit are due to an increase in production of 171 ADT/D (air dried ton per day) of pulp.

	proposed permit production rate (ADT/D)	previous permit production rate (ADT/D)
Subpart B - bleached market pulp (NSPS)	33	0
Subpart B - paperboard, coarse paper, & tissue paper (BPT)	115	115
Subpart B - paperboard, coarse paper, & tissue paper (NSPS)	301	218.75
Subpart C - unbleached kraft (BPT/BCT)	524	535.5
Subpart J - paperboard from wastepaper, corrugating medium furnish (NSPS)	510	442.5
Total	1483	1311.75

The increase is just over 10%. Improved efficiency, incremental improvements to the OCC processing system, and improved configuration of the No. 4 Recovery Furnace resulted in the increase.

The pH minimum limit was increased from 5.0 to 5.2 to assure compliance with receiving water quality criteria.

The proposed permit limits for non-conventional pollutants are summarized in the following table.

Effluent Limits for Non-Conventional Pollutants

Bleach Plant Effluent Limits

Pollutant	Daily Maximum	Monthly Average	Basis of Limit
Tetrachlorocatechol	< 5.0 µg/L [a/]	-	technology
Tetrachloroguaiacol	< 5.0 µg/L [a/]	-	technology
Trichlorosyringol	< 2.5 µg/L [a/]	-	technology
4,5,6-trichloroguaiacol	< 2.5 µg/L [a/]	-	technology
3,4,6-trichlorocatechol	< 5.0 µg/L [a/]	-	technology
3,4,5-trichlorocatechol	< 5.0 µg/L [a/]	-	technology
3,4,5-trichloroguaiacol	< 2.5 µg/L [a/]	-	technology
2,3,4,6-tetrachlorophenol	< 2.5 µg/L [a/]	-	technology
3,4,6-trichloroguaiacol	< 2.5 µg/L [a/]	-	technology
Pentachlorophenol	< 5.0 µg/L [a/]	-	technology

Pollutant	Daily Maximum	Monthly Average	Basis of Limit
2,4,6-trichlorophenol	< 2.5 µg/L [a/]	-	technology
2,4,5-trichlorophenol	< 2.5 µg/L [a/]	-	technology
2,3,7,8-TCDD [b/]	< 10 pg/L [a/]	-	technology
2,3,7,8-TCDF [b/]	31.9 pg/L	-	technology
Chloroform	7.3 lb/D	4.4 lb/D	technology

[a] This concentration represents the minimum level (ML – as defined in 40 CFR 430.01(i)) for this pollutant.

[b] 2,3,7,8-TCDD is 2,3,7,8-tetrachlorodibenzo-p-dioxin and 2,3,7,8-TCDF is 2,3,7,8-tetrachlorodibenzofuran.

Final Effluent Limits

Pollutant	Daily Maximum	Monthly Average	Basis of Limit
AOX	1004 lb/D	657 lb/D	technology

The only changes from the previous permit are summarized in the following table.

Pollutant	Daily Maximum	Monthly Average	Basis of Limit
AOX (proposed)	1004 lb/D	657 lb/D	technology
AOX (previous)	782 lb/D	512 lb/D	technology
Chloroform (proposed)	7.3 lb/D	4.4 lb/D	technology
Chloroform (previous)	5.7 lb/D	3.4 lb/D	technology

The increases are a result of the increase in unbleached pulp sent to the bleach plant from 411 ADT/D to 528 ADT/D. Production increases were due to more demand for bleached pulp and incremental increases in bleach plant efficiency.

V. MONITORING REQUIREMENTS

Ecology requires monitoring, recording, and reporting (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and that the discharge complies with the permit's effluent limits.

The monitoring schedule is detailed in the proposed permit under Condition S.2. Specified monitoring frequencies take into account the quantity and variability of the discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring.

EPA issued guidance allowing reduced monitoring frequency for demonstrated good performance (EPA memorandum from Robert Perciasepe and Steven A. Herman to Regional Administrators, April, 1996). In accordance with the EPA guidance, Simpson requested reduced

monitoring frequency for several parameters. Reduced monitoring frequencies in the proposed permit are summarized in the following table.

Final effluent monitoring

Parameter	Previous Permit	Proposed Permit
BOD_5	7×/wk	4×/wk
TSS	7×/wk	4×/wk
AOX	7×/wk	4×/wk

Bleach plant effluent monitoring.

Parameter	Previous Permit	Proposed Permit
Tetrachlorocatechol	1×/mth	1×/qtr
Tetrachloroguaiacol	1×/mth	1×/qtr
Trichlorosyringol	1×/mth	1×/qtr
4,5,6-trichloroguaiacol	1×/mth	1×/qtr
3,4,6-trichlorocatechol	1×/mth	1×/qtr
3,4,5-trichlorocatechol	1×/mth	1×/qtr
3,4,5-trichloroguaiacol	1×/mth	1×/qtr
2,3,4,6-tetrachlorophenol	1×/mth	1×/qtr
3,4,6-trichloroguaiacol	1×/mth	1×/qtr
Pentachlorophenol	1×/mth	1×/qtr
2,4,6-trichlorophenol	1×/mth	1×/qtr
2,4,5-trichlorophenol	1×/mth	1×/qtr
Chloroform	1×/wk	1×/mth

AOX and bleach plant effluent monitoring in the previous permit required the monitoring frequency specified in 40 CFR 430.02(a). The frequency was followed while the previous permit was in effect satisfying the 5 year period specified in 40 CFR 430.02(b). Therefore, Ecology applied EPA guidance to reduce monitoring frequency to those parameters noted in the previous table.

Performance requirements to continue the reduced frequencies are specified in the permit. Failure to maintain the performance requirements for a parameter will result in revision to the previous permit monitoring frequency for that parameter.

A. Lab Accreditation

Ecology requires that all monitoring data (with the exception of certain parameters) must be prepared by a laboratory registered or accredited under the provisions of chapter 173-50 WAC, *Accreditation of Environmental Laboratories.* Ecology accredited the laboratory at this facility for the following:

Biochemical Oxygen Demand, BOD/CBOD
Dissolved Oxygen
pH
Total Suspended Solids

Simpson uses accredited contract laboratories for analysis of other parameters required by the permit.

V. OTHER PERMIT CONDITIONS

A. Reporting and Recordkeeping

Ecology based permit condition S3 on our authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges (WAC 173-220-210).

B. Non Routine and Unanticipated Discharges

Occasionally, this facility may generate wastewater which was not characterized in the permit application because it is not a routine discharge and was not anticipated at the time of application. These wastes typically consist of waters used to pressure-test storage tanks or fire water systems or of leaks from drinking water systems. These generally clean waste waters may be contaminated with pollutants.

The permit authorizes non-routine and unanticipated discharges under certain conditions. The facility must characterize these waste waters for pollutants and examine the opportunities for reuse. Depending on the nature and extent of pollutants in this wastewater and on any opportunities for reuse, Ecology may:

- Authorize the facility to discharge the water directly via the process wastewater outfall or through a stormwater outfall for clean water.
- Require the facility to treat the wastewater.
- Require the facility to reuse the wastewater.

C. Spill Plan

This facility stores a quantity of chemicals on-site that have the potential to cause water pollution if accidentally released. Ecology can require a facility to develop best management plans to prevent this accidental release [section 402(a)(1) of the Federal Water Pollution Control Act (FWPCA) and RCW 90.48.080].

Simpson developed a plan for preventing the accidental release of pollutants to state waters and for minimizing damages if such a spill occurs. The proposed permit requires the facility to update this plan and submit changes to Ecology.

D. Solid Waste Plan

Simpson could cause pollution of the waters of the state through inappropriate disposal of solid waste or through the release of leachate from solid waste.

This proposed permit requires this facility to update the approved solid waste plan designed to prevent solid waste from causing pollution of waters of the state. The updated plan must be submitted to Ecology for approval (RCW 90.48.080).

E. Effluent Mixing Study

Simpson conducted mixing zone modeling prior to the previous permit issuance. Ecology determined the dilution factors determined were still applicable for the proposed permit. Because additional changes may occur during the term of the proposed permit, Ecology requires Simpson re-analyze discharge mixing characteristics of the discharge in the fourth year of the proposed permit term (Condition S.11). The facility must measure or model the characteristics of the mixture under conditions specified in the permit to assess whether our assumptions about dilution protect the receiving water quality outside the allotted dilution zone boundary.

F. Outfall Evaluation

Ecology requires Simpson to conduct an outfall inspection and submit a report detailing the findings of that inspection (proposed Permit Condition S.15). The facility must inspect its discharge pipe and diffusers to determine their physical condition, and to evaluate the extent of sediment accumulations in the vicinity of the outfall.

G. Treatment System Operating Plan

Ecology requires industries to take all reasonable steps to properly operate and maintain their wastewater treatment system in accordance with state and federal regulations (40 CFR 122.41(e) and WAC 173-220-150 (1)(g)). The facility must have and keep updated, a suitable operation and maintenance (O&M) manual. A treatment system operating plan (TSOP), which serves as the first chapter of the O&M manual, must be submitted to Ecology.

Implementation of the procedures in the O&M manual ensures the facility's compliance with the terms and limits in the permit.

H. Best Management Practices

Ecology requires Simpson to follow Best Management Practice (BMP) requirements as defined in 40 CFR Part 430.03, The Permittee must develop and implement a plan to prevent spills and leaks of spent pulping liquors, turpentine, and soap which may reach the wastewater treatment system and adversely impact the system's performance. Permit Condition S10 includes BMP requirements.

I. Additional Chemical Analysis of the Effluent

Ecology requires Simpson to annually sample the final effluent and analyze the sample for the priority pollutants and other pollutants listed in permit condition S.14.

J. General Conditions

Ecology bases the standardized General Conditions on state and federal law and regulations. They are included in all individual industrial NPDES permits issued by Ecology.

VI. PERMIT ISSUANCE PROCEDURES

A. Permit Modifications

Ecology may modify this permit to impose numerical limits, if necessary to comply with water quality standards for surface waters, with sediment quality standards, or with water quality standards for ground waters, after obtaining new information from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

Ecology may also modify this permit to comply with new or amended state or federal regulations.

B. Proposed Permit Issuance

This proposed permit includes all statutory requirements for Ecology to authorize a wastewater discharge. The permit includes limits and conditions to protect human health and aquatic life, and the beneficial uses of waters of the State of Washington. Ecology proposes to issue this permit for a term of five years.

VII. REFERENCES FOR TEXT AND APPENDICES

Environmental Protection Agency (EPA)

1991. Technical Support Document for Water Quality-based Toxics Control. EPA/505/2-90-001.

1988. Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling. USEPA Office of Water, Washington, D.C.

1985. Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water. EPA/600/6-85/002a.

1983. Water Quality Standards Handbook. USEPA Office of Water, Washington, D.C.

Tsivoglou, E.C., and J.R. Wallace.

1972. Characterization of Stream Reaeration Capacity. EPA-R3-72-012. (Cited in EPA 1985 op.cit.)

Washington State Department of Ecology.

1994. Permit Writer's Manual. Publication Number 92-109

Washington State Department of Ecology.

Laws and Regulations(http://www.ecy.wa.gov/laws-rules/index.html)

Permit and Wastewater Related Information (http://www.ecy.wa.gov/programs/wq/wastewater/index.html

Wright, R.M., and A.J. McDonnell.

1979. In-stream Deoxygenation Rate Prediction. Journal Environmental Engineering Division, ASCE. 105(EE2). (Cited in EPA 1985 op.cit.)

APPENDIX A--PUBLIC INVOLVEMENT INFORMATION

Ecology proposes to reissue a permit to Simpson Tacoma Kraft Company, LLC. The permit prescribes operating conditions and wastewater discharge limits. This fact sheet describes the facility and Ecology's reasons for requiring permit conditions.

Ecology will place a Public Notice on August 12, 2008 in *Tacoma News Tribune* to inform the public and to invite comment on the proposed reissuance of this National Pollutant Discharge Elimination System permit as drafted.

The Notice –

- tells where copies of the draft Permit and Fact Sheet are available for public evaluation (a local public library, the closest Regional or Field Office, posted on our website.).
- offers to provide the documents in an alternate format to accommodate special needs.
- asks people to tell us how well the proposed permit would protect the receiving water.
- invites people to suggest fairer conditions, limits, and requirements for the permit.
- invites comments on Ecology's determination of compliance with antidegradation rules.
- urges people to submit their comments, in writing, before the end of the Comment Period
- tells how to request a public hearing of comments about the proposed NPDES Permit.
- explains the next step(s) in the permitting process.

Ecology has published a document entitled **Frequently Asked Questions about Effective Public Commenting** which is available on our website at http://www.ecy.wa.gov/biblio/0307023.html.

You may obtain further information from Ecology by telephone, (360)407-6954, or by writing to the permit writer at the address listed below.

Robert Carruthers
Department of Ecology
Industrial Section
P. O. Box 47600
Olympia, WA 98504-7600

The primary author of this permit and fact sheet is Robert Carruthers.

APPENDIX B--GLOSSARY

Acute Toxicity--The lethal effect of a compound on an organism that occurs in a short period of time, usually 48 to 96 hours.

ADT/D--An acronym for "air dried ton per day".

ADTP--An acronym for "air dried ton of pulp".

AKART-- An acronym for "all known, available, and reasonable methods of prevention, control and treatment".

Ambient Water Quality--The existing environmental condition of the water in a receiving water body.

Ammonia--Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

Average Monthly Discharge Limitation --The average of the measured values obtained over a calendar month's time.

Best Management Practices (BMPs)--Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the State. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

BOD_5--Determining the Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD_5 is used in modeling to measure the reduction of dissolved oxygen in receiving waters after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

Bypass--The intentional diversion of waste streams from any portion of a treatment facility.

Chlorine--Chlorine is used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

Chronic Toxicity--The effect of a compound on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

Clean Water Act (CWA)--The Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

Compliance Inspection - Without Sampling--A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

Compliance Inspection - With Sampling--A site visit to accomplish the purpose of a Compliance Inspection - Without Sampling and as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the 85 percent removal requirement. Additional sampling may be conducted.

Composite Sample--A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing discrete samples. May be "time-composite"(collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots.

Construction Activity--Clearing, grading, excavation and any other activity which disturbs the surface of the land. Such activities may include road building, construction of residential houses, office buildings, or industrial buildings, and demolition activity.

Continuous Monitoring –Uninterrupted, unless otherwise noted in the permit.

Critical Condition--The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

Dilution Factor (DF)--A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the percent effluent fraction e.g., a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

Engineering Report--A document which thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report must contain the appropriate information required in WAC 173-240-060 or 173-240-130.

Fecal Coliform Bacteria--Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

Grab Sample--A single sample or measurement taken at a specific time or over as short a period of time as is feasible.

Industrial Wastewater--Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business, from the development of any natural resource, or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

Major Facility--A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Maximum Daily Discharge Limitation--The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

Method Detection Level (MDL)--The minimum concentration of a substance that can be measured and reported with 99% confidence that the pollutant concentration is above zero and is determined from analysis of a sample in a given matrix containing the pollutant.

Minor Facility--A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Mixing Zone--An area that surrounds an effluent discharge within which water quality criteria may be exceeded. The area of the authorized mixing zone is specified in a facility's permit and follows procedures outlined in state regulations (chapter 173-201A WAC).

National Pollutant Discharge Elimination System (NPDES)--The NPDES (Section 402 of the Clean Water Act) is the Federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the State of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both State and Federal laws.

pH--The pH of a liquid measures its acidity or alkalinity. A pH of 7 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

Quantitation Level (QL)-- A calculated value five times the MDL (method detection level).

Responsible Corporate Officer-- A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or have gross annual sales or expenditures exceeding $25 million (in second quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures (40 CFR 122.22).

Technology-based Effluent Limit--A permit limit that is based on the ability of a treatment method to reduce the pollutant.

Total Suspended Solids (TSS)--Total suspended solids is the particulate material in an effluent. Large quantities of TSS discharged to receiving waters may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

State Waters--Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

Stormwater--That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

Upset--An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limits because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

Water Quality-based Effluent Limit--A limit on the concentration of an effluent parameter that is intended to prevent the concentration of that parameter from exceeding its water quality criterion after it is discharged into receiving waters.

APPENDIX C--TECHNICAL CALCULATIONS

Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found on Ecology's homepage at http://www.ecy.wa.gov.

Summary of Limit Calculations

				CFR Allowance				Proposed Permit Limit			
Production Class	10/05 - 9/07 Average Production (T)	Type Production	Production by Type (T)	BOD_5 mthy ave (lb/T)	BOD_5 daily max (lb/T)	TSS mthy ave (lb/T)	TSS daily max (lb/T)	BOD_5 mthy ave (lb/D)	BOD_5 daily max (lb/D)	TSS mthy ave (lb/D)	TSS daily max (lb/D)
C[1]	524	BPT/BCT	524	5.6	11.2	12	24	2934	5869	6288	12576
		NSPS	0								
J[2]	510	BPT/BCT	0								
		NSPS	510	4.2	7.8	4.6	8.8	2142	3978	2346	4488
B[3]	33	BPT/BCT	0								
		NSPS	33	11	20.6	19	36.4	363	680	627	1201
B[4]	416	BPT/BCT	115	14.2	27.3	25.8	48	1633	3140	2967	5520
		NSPS	301	9.2	17	15.2	29.2	2769	5117	4575	8789
Total	1483							9841	18784	16803	32574
Limit								9840	18780	16800	32570

	CFR Allowance			Proposed Permit Limit	
	Daily Maximum (lb/ADTP)	Monthly Average (lb/ADTP)	10/05 - 9/07 Average Production (ADTP/D)[5]	Daily Maximum (lb/D)	Monthly Average (lb/D)
AOX	1.902	1.246	528	1004	657
Chloroform	0.0138	0.0083	528	7.3	4.4

1 Unbleached Pulp
2 Paperboard from Wastepaper
3 Market Bleached Pulp
4 Board Course Tissue Bleached Kraft
5 Unbleached Pulp Sent to Bleach Plant

Simpson NPDES 2008 - Comparison of Scan Detects and Water Quality Criteria										
	WATER QUALITY CRITERIA (in ug/L unless otherwise noted)									
	PRIOR	CAR	Water Quality Criteria		Human Health Criteria	Metals Translators				
	ITY	CIN	Marine			Marine		Simpson	Simpson	
Pollutant, CAS No. & Application Ref. No.	PLTNT?	GEN?	acute	chronic	Marine	Acute	Chronic	ave	max	# samples
ALUMINUM, total recoverable, pH 6.5-9.0 7429905	N	N						515		1
AMMONIA **(mgN/L)**	N	N	4.2	0.63				0.54	5.4	726
ANTIMONY (INORGANIC) 7440360 1M	Y	N			4300			<1.0	2	4
ARSENIC (dissolved) 7440382 2M	Y	Y	69	36		1.00				
ARSENIC (inorganic)	Y	Y			0.14			<22	59	5
BARIUM								66		1
BHC - GAMMA 58899 4P (Lindane)	N	Y	0.16		0.063			<0.039	0.040	5
BORON								884		1
CADMIUM - 7440439 4M Hardness dependent	Y	N	42.00	9.3		0.994	0.994	<1.3	1.8	5
CHLOROFORM 67663 11V	Y	Y			470			<7	9.3	5
CHROMIUM(TOTAL)								10	17	5
CHROMIUM(HEX) 18540299	Y	N	1100	50		0.993	0.993			
COBALT								0.5		1
COLOR	N	N						750		1
COPPER - 744058 6M Hardness dependent	Y	N	4.80	3.10		0.83	0.83	7	10	5
IRON 7439896	N	N						171		1
LEAD - 7439921 7M Dependent on hardness	Y	N	210.00	8.10		0.951	0.95	3	9	5
MAGNESIUM								190000		1
MANGANESE 7439965	N	N			100.00			252		1
MERCURY 7439976 8M	Y	N	1.80	0.0250	0.15	0.85		<0.2	<0.2	4
Mercury - low level analysis								<0.008	0.0113	2
MOLYBDENUM								12		1
NICKEL - 7440020 9M - Dependent on hardness	Y	N	74.00	8.20	4600	0.99	0.99	<12	20	5
pH	N	N		7.0 - 8.5				5.20 (min)	8.50	731
PHENOLS, TOTAL								0.03	0.11	4
SELENIUM 7782492 10M	Y	N	290	71	4200.00			<11	37	5
TITANIUM								12		1
ZINC- 7440666 13M hardness dependent	Y	N	90.00	81.00		0.946	0.946	54	103	5
* = INSUFFICIENT DATA TO DEVELOP CRITERIA VALUE										
PRESENTED IS THE L.O.E.L- LOWEST OBSERVED				SPREADSHEET CREATED BY D. NUNNALLEE, REV. 1-92 BY G. SHERVEY						

This spreadsheet is split so that you can copy substances of interest into the top portion of the spreadsheet and obtain a printout of just the pollutants of interest. Updated the formulas and values to match with WAC 173-201A in December of 1992. Enter the hardness value for the receiving water for hardness dependent metals in B200 and TSS values in B199.
Spreadsheet updated with human health criteria by Gary Bailey in March 1995 and checked by G. Shervey
Metal criteria changed to those announced in FR Vol. 60 No.86 5/4/95 (10/95)
Metal translators added 6/96 (based on work by Pelletier and FR Vol 60, No.86 5/4/95)
Criteria values updated 9/03

Simpson Reasonable Potential Calculations

				State Water Quality Standard		Max concentration at edge of...			CALCULATIONS								
Parameter	Metal Criteria Translator as decimal Acute	Metal Criteria Translator as decimal Chronic	Ambient Concentration (metals as dissolved) *ug/L*	Acute *ug/L*	Chronic *ug/L*	Acute Mixing Zone *ug/L*	Chronic Mixing Zone *ug/L*	LIMIT REQ'D?	Effluent percentile value	*Pn*	Max effluent conc. measured (metals as total recoverable) *ug/L*	Coeff Variation *CV*	*s*	# of samples *n*	Multiplier	Acute Dil'n Factor	Chronic Dil'n Factor
Ammonia			24	4200	630	138.16	59.43	NO	0.95	0.996	5400.00	0.60	0.55	726	0.58	27	87
Copper	0.83	0.83	0.90	4.8	3.1	1.58	1.11	NO	0.95	0.549	10.00	0.60	0.55	5	2.32	27	87
Nickel	0.99	0.99	0.48	74	8.2	2.17	1.00	NO	0.95	0.549	20.00	0.60	0.55	5	2.32	27	87
Zinc	0.946	0.946	2.1	90	81	10.41	4.68	NO	0.95	0.549	103.00	0.60	0.55	5	2.32	27	87

This spreadsheet calculates the reasonable potential to exceed state water quality standards for a small number of samples. The procedure and calculations are done per the procedure in Technical Support Document for Water Quality-based Toxics Control, U.S. EPA, March, 1991 (EPA/505/2-90-001) on page 56. User input columns are shown with red headings. Corrected formulas in col G and H on 5/98 (GB)

metals ambient data from "Metals Concentrations in Commencement Bay Waterways During 1997 - 1998," February 1999, Ecology Publication No. 99-308.
ammonia ambient data from Ecology EAP data from 2005 for station CMB003 - see calculation in this appendix for calculation of ammonia standard

Calculation of pH of a mixture in seawater - pH limit 5.0.
Based on the CO2SYS program (Lewis and Wallace, 1998)
http://cdiac.esd.ornl.gov/oceans/co2rprt.html

INPUT

1. MIXING ZONE BOUNDARY CHARACTERISTICS	
Dilution factor at mixing zone boundary	87.000
Depth at plume trapping level (m)	9.800
2. BACKGROUND RECEIVING WATER CHARACTERISTICS	
Temperature (deg C):	14.47
pH:	7.70
Salinity (psu):	24.00
Total alkalinity (meq/L)	2.50
3. EFFLUENT CHARACTERISTICS	
Temperature (deg C):	37.00
pH:	5.00
Salinity (psu)	11.10
Total alkalinity (meq/L):	2.50

4. CLICK THE 'calculate" BUTTON TO UPDATE OUTPUT RESULTS >>> calculate

OUTPUT

CONDITIONS AT THE MIXING ZONE BOUNDARY	
Temperature (deg C):	14.73
Salinity (psu)	23.85
Density (kg/m^3)	1017.50
Alkalinity (mmol/kg-SW):	2.46
Total Inorganic Carbon (mmol/kg-SW):	2.63
pH at Mixing Zone Boundary:	7.09

Calculation of pH of a mixture in seawater - pH limit 5.2.
Based on the CO2SYS program (Lewis and Wallace, 1998)
http://cdiac.esd.ornl.gov/oceans/co2rprt.html

INPUT

1. MIXING ZONE BOUNDARY CHARACTERISTICS	
Dilution factor at mixing zone boundary	87.000
Depth at plume trapping level (m)	9.800
2. BACKGROUND RECEIVING WATER CHARACTERISTICS	
Temperature (deg C):	14.47
pH:	7.70
Salinity (psu):	24.00
Total alkalinity (meq/L)	2.50
3. EFFLUENT CHARACTERISTICS	
Temperature (deg C):	38.90
pH:	5.20
Salinity (psu)	11.29
Total alkalinity (meq/L):	2.50

4. CLICK THE 'calculate" BUTTON TO UPDATE OUTPUT RESULTS >>> calculate

OUTPUT

CONDITIONS AT THE MIXING ZONE BOUNDARY	
Temperature (deg C):	14.75
Salinity (psu)	23.85
Density (kg/m^3)	1017.49
Alkalinity (mmol/kg-SW):	2.46
Total Inorganic Carbon (mmol/kg-SW):	2.55
pH at Mixing Zone Boundary:	7.28

Calculation of seawater fraction of un-ionized ammonia from Hampson (1977). Un-ionized ammonia criteria for salt water are from WAC 173-201A and EPA 440/5-88-004.

INPUT	
1. Temperature (deg C):	14.5
2. pH:	8.4
3. Salinity (g/Kg):	20.8

OUTPUT	
1. Unionized ammonia NH3 criteria (mgNH3/L)	
Acute:	0.233
Chronic:	0.035
2. Total ammonia nitrogen criteria (mgN/L)	
Acute:	3.449
Chronic:	0.518

APPENDIX D--RESPONSE TO COMMENTS

Ecology makes the draft permit and fact sheet available for public review and comment at least thirty (30) days before issuance of the final permit to the facility operator (WAC 173-220-050). Copies of the fact sheet and draft permit for Simpson, NPDES Permit No. WA-000085-0, were made available for public review and comment from August 12, 2008 until the close of business September 12, 2006. No comments were received from any party.